**The Report Committee for Katherine Marie Trundt**
**Certifies that this is the approved version of the following report:**

# Toward a New Model of Adaptability

**APPROVED BY**
**SUPERVISING COMMITTEE:**

**Supervisor:**

Cindy Carlson

Greg Allen

# Toward a New Model of Adaptability

**by**

**Katherine Marie Trundt, B.S., B.A.**

**Report**

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

**Master of Arts**

**The University of Texas at Austin**

**December 2010**

# Abstract

## Toward a New Model of Adaptability

Katherine Marie Trundt, M.A.

The University of Texas at Austin, 2010

Supervisor: Cindy Carlson

Adaptability, defined as "the ability to make fit (as for a specific or new use or situation) often by modification" (Merriam-Webster, 2009), has been studied in a variety of fields, including psychology. Despite widespread use of the term, existing models of adaptability appear to be inadequate. In working towards developing a new, multidimensional model of adaptability, the purpose of the proposed study is to conduct a preliminary investigation using Confirmatory Factor Analysis to a) better understand the relationship among the proposed components of adaptability and b) explore the degree to which these components measure an overarching adaptability construct. The proposed underlying components of adaptability include cognitive flexibility, emotional competence, social skills, and temperament.

## Table of Contents

# List of Figures

## Chapter 1: Introduction

When Nagel (1908, p 349) wrote, "life is only possible by the presence of adaptability," he used the term in the Darwinian sense, referring to the biological ability of living organisms to randomly adapt to a particular environment over the course of generations. Within the field of psychology, the construct of adaptability has additionally come to refer to a person's ability to adapt or adjust to the environment in which he or she lives (e.g. Burgess & Wallin, 1953).

Although the term adaptability has since taken on new meaning, Nagel's words still ring true. In fact, some argue that an individual's success in most human societies has depended and continues to depend upon "his ability to rapidly evolve behavior patters which fit him to the kaleidoscope of the conditions he encounters" (Dobhansky & Montagu, 1947, p 588), and that the main task of human life is adaptation to the social environment (Rosca, 1936). Imagine, for example, a recently immigrated child attending an American school for the first time. The attitudes of his family and community may reflect a culture very different from mainstream America, resulting in situations that may be defined for him by patterns unlike those presented in school. He may even be "praised at home for the very things for which he is blamed at school" (Boardman, 1934, p 375). This particular scenario requires that the individual adapt to the school environment or school culture in order to be successful. Additional examples include the currently increasing need for individual adaptability as a response to advancements in technology, new economic and political developments, and social change (Herr, 1993). In the

workplace, adaptability has been recognized as essential for adjustment to changing work roles (MacEachen, Polzer, & Clarke, 2008); moreover, the field has "long acknowledged the importance of employees' abilities to respond to changing workplace demands, in order to fit and survive" (e.g. Bretz & Judge, 1994, in Fugate & Kinicki, 2008).

The importance of being able to adapt to one's environment is thus undeniable; however, upon exploring the relevant literature, it becomes very clear that how to define the construct is still up for debate. Although definitions often resemble each other to some extent, there are variations among them, with some describing a characteristic of a system rather than an individual, as in Olson's family systems theory (Olson, Russell, & Sprenkle, 1983). Others focus on the individual, but only within a particular system or context, as is the case in much of the research investigating adaptability in the workplace (e.g. Hall, 2002; Pearlman & Barney, 2000; Pulakos, Arad, Donovan, & Plamondon, 2000), parental adaptability (Tallman, 1961), and social adaptability (e.g. Flemming, 1933; Gibbons & Porter, 1939). Adaptability and the areas of personality and temperament have also been linked in a variety of ways (e.g. Costa & McRae, 1992; McCrae & Costa, 1989; Thomas, Chess, Birch, Hertzig, & Korn, 1963). Still others describe constructs that appear to relate to adaptability but may have not been directly linked to the actual term, including, for example, cognitive flexibility (Ahn, Kim, & Park, 2008; Ciairano, Bonino, & Miceli, 2006), emotional competence (Wong & Ang, 2007), and resilience (Walker, Gleaves, & Grey, 2006).

Despite the prevalence of related research in this area, the field lacks a valid model of adaptability (Pulakos, Arad, Donovan, & Plamondon, 2000). An inherent flaw

in the specific conceptualizations is that they cannot then generalize to other domains or areas in which adaptability might be applicable. "What is missing from current research is a broad-based understanding of the determinants… of individual differences in adaptability" (Ployhart & Bliese, 2006, p12). Consequently, there is a need for a more inclusive and comprehensive model of adaptability that encompasses each underlying component.

Adaptability as a construct has a variety of components and underlying mechanisms (e.g. Ployhart & Bliese, 2006). In other words, there are a number of characteristics and skills possessed by an individual that make him or her more capable of adapting to new circumstances or situations, and thus the definition, or a model, of adaptability should not be limited by excluding any of these components. Nor should it be limited to specific contexts. Thus, in working towards developing a new model of adaptability, the purpose of the current study is a) to better understand the relationship among the proposed components of adaptability and b) to determine the degree to which these components measure an overarching adaptability construct. Because adaptability is so ubiquitous in the lives of people, having an accurate understanding of the construct can have positive effects in the areas of performance, diagnosis, intervention, and particularly in the area of leadership and employee development.

## Chapter 2: Integrative Analysis

The following analysis begins with a section describing the various definitions of adaptability in an attempt to establish the prevalence and breadth of the adaptability literature and to illuminate the challenges associated with identifying an adequate definition of adaptability. Specifically, the first section describes how adaptability has been defined in the literature and addresses the lack of organization, the limitations of certain definitions, and the identification of an appropriate definition. The second section evaluates various models of adaptability, including historical and current models, illuminating their strengths and weaknesses. The third section explores relevant research according to two systems of organization and concludes with an analysis that proposes certain underlying components of adaptability. Following the identification of the underlying components of adaptability, a guiding framework is described to present a structure for how these underlying components relate to each other. The integrative analysis concludes with a synthesis of the above information and its application, resulting in a proposed model of adaptability.

### Defining Adaptability

Before one can investigate a particular idea or construct, the construct must be defined. As previously mentioned, when applied to specific disciplines or contexts, the term *adaptability* takes on a variety of meanings, often itself being "adapted" to fit a particular context or area of interest. There are literally thousands of publications exploring adaptability and other related constructs, and consequently, identifying an adequate definition of adaptability was much more challenging than expected.

First of all, adaptability has been defined as both a quality of a system as well as an individual characteristic. For example, Olson, Russell, and Sprenkle (1983) applied the term adaptability to family systems theory, describing it as, "the ability of a marital or family system to change its power structure, role relationships, and relationship rules in response to situational and developmental stress." An alternative, more general systemic definition provided by Christenson, Zabriskie, Eggett and Freeman (2006) describes families high in adaptability as families that are "more flexible in dealing with new situations or solving problems."

In contrast to the systemic definition, adaptability has also been identified as an individual or personal characteristic. This approach is more popular than the systemic description, as evidenced by its higher frequency in the literature. Examples of adaptability defined as an individual characteristic can be found within the areas of temperament (e.g. McDonnell & Beck, 1986; Thomas, Chess, Birch, Hertzig, & Korn, 1963), childrearing (Tallman, 1961), social functioning (e.g. Flemming, 1933; Gibbons & Porter, 1939; Rosca, 1936), task performance (e.g. Pulakos, Arad, Donovan, and Plamondon, 2000), job performance (e.g. Campbell, McCloy, Oppler, & Sager, 1993), and learning (e.g. Baldwin & Ford, 1988), among others. Although each of these definitions has at least one thing in common—adaptability as an individual characteristic—there are several ways in which these definitions vary.

A second challenge to identifying an adequate definition of adaptability relates to the fact that many definitions are limited to specific contexts. For example, some definitions apply only to social situations—describing adaptability as a person's ability to

get along with others is fairly common, especially in earlier research (e.g. Flemming, 1933; Gibbons & Porter, 1939; Rosca, 1936; Wells, 1914). Another case in which adaptability has been defined in a context-specific manner is in the case of "parental adaptability" (Tallman, 1961). Tallman conceptualizes the childrearing process as a series of problem-solving situations, and thus he defines parent adaptability as the "parent's ability to deal effectively with problem situations by changing roles, attitudes, and actions in terms of new or modified understandings of the situation with which he is confronted" (1961, p 654). Although this context-specific approach is useful for its particular domain, it limits the generalizability of the findings. Moreover, restricting research to specific contexts for adaptability also makes integration of the literature difficult due to the lack of one unified perspective (Ployhart & Bliese, 2006).

This challenge of generalizability can easily be addressed with the use of a more broad-based definition of adaptability. One example of a more general definition is "the capacity of a human organism to intentionally modify its reactions in the presence of unfamiliar external circumstances or unfamiliar internal states is such a way as to make for its survival" (Laycock, 1929, p 18). Other researchers have more recently defined adaptability as "an individual's ability, skill, disposition, willingness, and/or motivation, to change or fit different task, social, and environmental features" (Ployhart & Bliese, 2006), and as "handling ambiguity, dealing with uncertainty and stress, and working outside traditional temporal and geographic boundaries" (O'Connell, McNeely, & Hall, 2008, p 249). These more general definitions are also fairly prevalent in the field.

One criticism that still remains, however, even with the use of a more general

definition, is that variables are still only applied or researched in specific contexts. An additional critique of some general definitions is that they are actually too general with too many meanings, which can make a definition worthless for scientific use in psychology (Laycock, 1929, p 16). Too much specificity has limitations as well, as already established. Thus, there is a necessity for a definition that is, in the words of Goldilocks, "just right." One such definition defines adaptability as the "capacity of the person to change his roles, his attitudes, and his behavior in order to adjust to those of other persons or to new or modified situations" (Burgess & Wallin, 1953, p 623, in Tallman, 1961, p 654). This definition meets the requirements of being broad enough to overcome the limitations of the more specific definitions, yet specific enough to be scientifically useful. Furthermore, it implies that adaptability is an individual characteristic, rather than a quality of a system or organization.

**Models of Adaptability**

Even after the initial step of identifying an acceptable definition of adaptability, the issue of structure still remains. In other words, what does adaptability look like? Based on the established definition, adaptability is already conceived of as an individual characteristic; however, the nature of this individual characteristic is still in question, specifically with regard to its structure and role.

***Early models.*** One of the earliest models of adaptability, proposed by Wells (1914) almost one hundred years ago, was intended to describe the "proper mental adjustment of the personality to its environment" (1914, p 295). Following the precedent established by Hoch and Amsden in an unpublished manuscript, Wells describes a

perspective that views personality as a whole, with adaptability referring to "the general efficiency of its adaptive functions" (p 304). Wells views adaptability as a composite, comprised of five components. These five components include how to get along with other children, how to get along with people in older years (tactfulness), how conformable to discipline, tendency to be guided by advice, and how resourceful. All of these factors were especially important at the time of publication, as the view of "distinct unpopularity and inability to get along with others" (p 305) was one that implied a "defective personality." Although Wells' model received little attention in later research, it set a precedent of establishing adaptability as a multi-componential construct, which has remained present in the literature ever since.

Another early conceptualization of adaptability was as a form of intelligence. In his book, Laycock (1929) presents intelligence as an individual's ability to adapt to new situations. He focused primarily on the "cognitive field" for the purposes of his writing, but he also acknowledged the need for future research "along the lines of the emotional and conative factors involved in adaptability" (p 19). Laycock's lack of empirical research relating to his proposed factors of adaptability can be viewed as a weakness or limitation in his work. However, the impact of his statement is significant. Despite not delving into the specific details regarding all three of his recognized factors of adaptability, Laycock acknowledged a) that adaptability is comprised of multiple factors, and b) that these factors likely include cognitive, emotional, and conative components.

***Recent models.*** More contemporary models of adaptability offer multi-factor structures similar to that of Laycock (1929), but the models are somewhat more detailed

and complex. O'Connell, McNeely, and Hall (2008) propose a "conceptual model of the antecedents of personal adaptability" (p 249), which includes individual characteristics, human capital factors, and characteristics of the work environment. The model is depicted in Figure 1. Unfortunately, there are a number of limitations to this model—the list of individual characteristics does not even attempt to be comprehensive, the entire model is designed to be context-specific in applying only to the workplace, and the empirical research within the article did not demonstrate adequate support for the model. Another limitation is that in describing the "antecedents" to adaptability, there is an inherent implication that adaptability is a process, yet the authors do not address this issue.

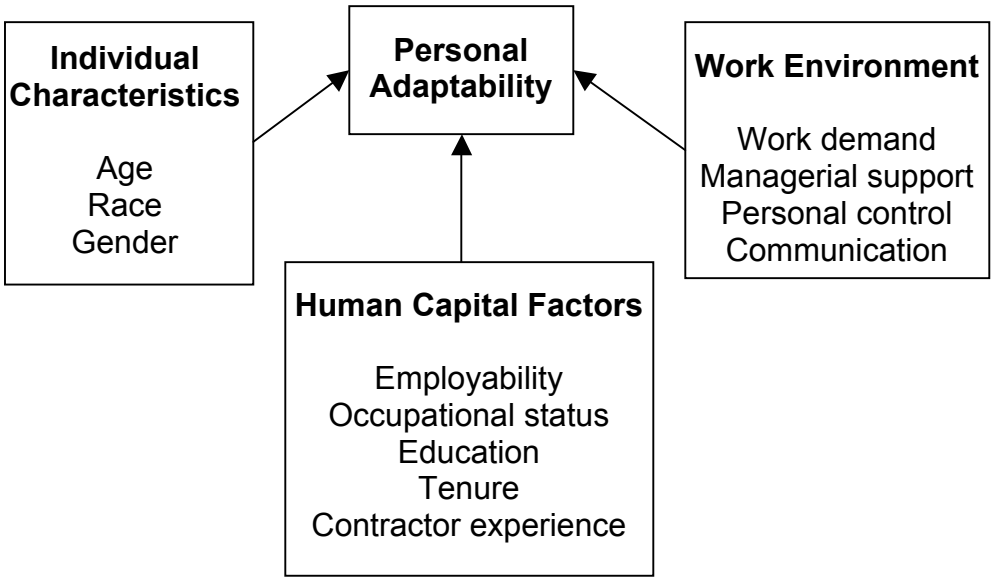



Figure 1: Conceptual model of antecedents of personal adaptability (O'Connell, McNeely, & Hall, 2008)

Ployhart and Bliese (2006) have also recently proposed a model of individual

adaptability (I-ADAPT theory). Before delving into the details of this particular model, it should be noted that this book chapter was discovered late in the writing process of the current manuscript. On one hand it served to validate much of what the proposed study is suggesting, in the sense that both make consistent claims regarding the lack of consensus or organization surrounding adaptability, both argue that there is a significant need for a better understanding of the construct, and both define adaptability similarly, as an individual characteristic that is present across contexts. Although I-ADAPT theory was published chronologically before the O'Connell, McNeely, and Hall model, the I-ADAPT model is conceptually more complex and thorough, and is thus discussed subsequent to the O'Connell model.

According to the I-ADAPT model, individual adaptability is determined by a multidimensional set of individual characteristics—specifically, knowledge, skills, abilities and other characteristics (KSAOs) that influence adaptability. General KSAOs proposed by Ployhart and Bliese include, "cognitive ability, certain personality traits, preferences, and stress and coping skills" (p 14). The I-ADAPT model proposes that individual differences in adaptability fit within a framework of KSAO-performance relationships. The overall model is somewhat complex, with individual characteristics influencing individual adaptability, which in turn must pass through certain mediating processes, and ultimately results in adaptive performance. The authors acknowledge the influence of environmental factors as well. An illustration of the model appears below in Figure 2.

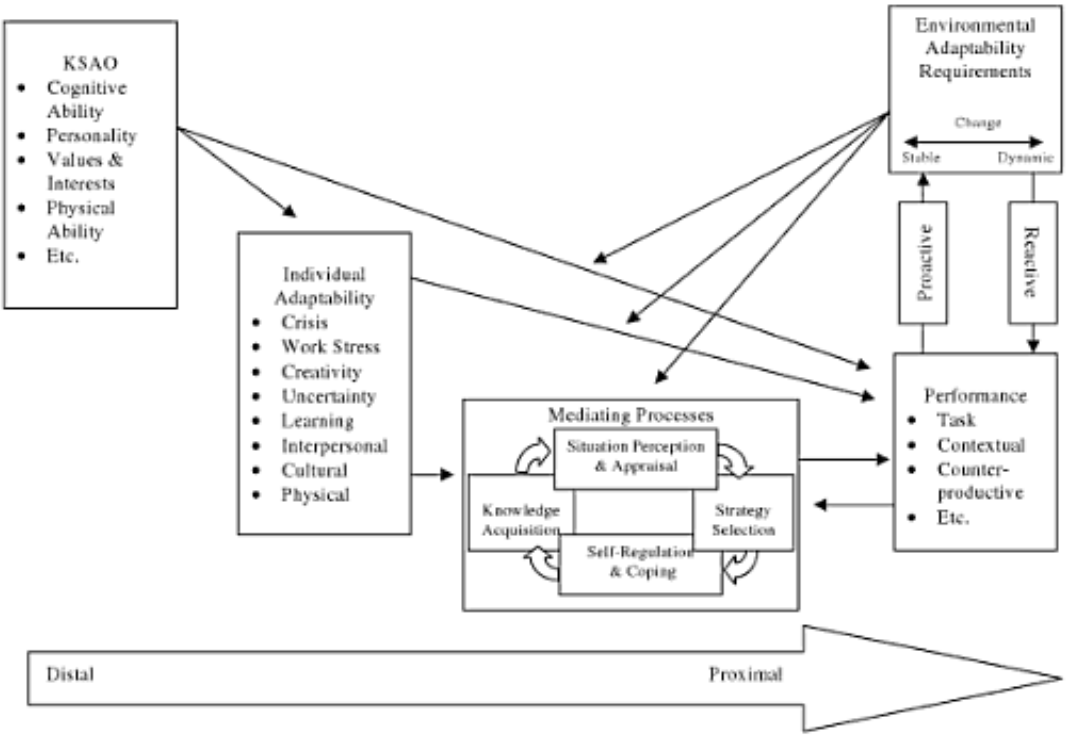



Figure 2: Individual Adaptability (I-ADAPT) Theory (Ployhart & Bliese, 2006)

In evaluating certain aspects of the I-ADAPT model, its sophistication may be viewed as a strength of the model, as it is demonstrably more comprehensive than the other models of adaptability discussed. At the same time, there are also weaknesses to be addressed. First of all, the authors place significant emphasis on the need to establish a "broad-based understanding of the determinants and consequences of individual differences in adaptability" (p 12), particularly with regard to understanding the KSAO piece of the model. When considered alone, this appears to be intuitive and provides further support for this model. However, the authors have yet to conduct any sort of empirical study to explore these issues. Furthermore, despite the complexity of the model, the authors do not propose any sort of framework or structure for the KSAOs

associated with adaptability. In fact, they describe adaptability simply as a "broad-based summary of KSAOs" (p15) and instead elect to focus on eight dimensions of adaptability proposed by Pulakos and colleagues (2000; 2002), which purportedly encompass any variance accounted for by the KSAOs without explicitly identifying, defining, or measuring them. In this way, this particular model may benefit from an additional level of sophistication. Despite these limitations, this model appears to be the most comprehensive model of adaptability to date, and provides an important contribution to the adaptability literature.

**Components of Adaptability**

Having explored some current models of adaptability to get a sense of the big picture, the time has come to shift to a slightly more detailed perspective, focusing on the more specific findings within the literature. The following section is divided into two parts based on differences in the organization of the literature.

**Adaptability as—.** Ployhart and Bliese (2006) conducted a review the literature before describing their model, choosing to organize the literature according to particular conceptualizations of adaptability. Specifically, the authors focused on adaptability as task performance, temperament, coping with stress, cognitive adaptation, and reaction to organizational change. These are summarized below.

Adaptability as task performance defines adaptability as how well an individual performs when an environmental factor or task is changed. Typically the antecedents to adaptive behavior from this perspective are defined "in terms of the knowledge, skills, abilities, and other characteristics (KSAOs) that relate to adaptive performance" (p 6).

One example provided is a study by LePine, Colquitt, and Erez (2000), in which individual differences such as cognitive ability, openness, and conscientiousness, produced stronger effects in task changes, suggesting that individual characteristics may be important and significant predictors of adaptive performance. Another type of task-performance adaptability can be conceptualized within the training literature, where the ability to generalize and transfer knowledge in new or changing performance situations is considered adaptation (Baldwin & Ford, 1988).

The area of cognitive adaptation refers to adaptability as a change in strategy selection. Strategy selection differs from the task-performance approach in the sense that individual differences are attributed to adaptive strategy selection rather than KSAOs. Specifically, strategy selection refers to the ability to identify context cues, pull from a pool of strategies, and finally select the best strategy for the situation presented.

Coping, an additional area of research linked to adaptability, is described in the chapter as the way in which individuals deal with stressful situations. The authors argue that the very nature of coping when defined in this way makes it "fundamentally similar to individual adaptability" (p 9). There are a number of theories of coping described by Ployhart and Bliese, for example the distinction between active and passive coping styles (Taylor & Aspinwall, 1996, in Ployhart & Bliese, 2006) and the distinction between problem-focused and emotion-focused coping strategies (Pearlin & Schooler, 1978, in Ployhart & Bliese, 2006). The authors acknowledge that coping has not traditionally been included within the area of adaptability research; however, they cite Pulakos and colleagues' (2000) taxonomy of adaptability, which identified the ability to handle

stressful situations as a type of adaptability, as support for its consideration within the realm of adaptability.

The final area of research explored by Ployhart and Bliese is reaction to organizational change. One primary study discussed in this section is that of Judge, Thoresen, Pucik and Welbourne (1999), in which dispositional antecedents—including locus of control, generalized self-efficacy, self esteem, positive affectivity, openness to experience, tolerance for ambiguity, and risk aversion—predicted scores on a measure of coping with organizational change.

The previous summary demonstrates one way of organizing the literature to aid in clarifying some of the broad areas of adaptability. The authors additionally offer some criticisms based on these varying perspectives. First of all, it is unclear whether the findings from each specific domain of research are generalizable to the other domains. A related critique is that in the literature defining adaptability as task performance, there are a number of KSAOs identified, but they may be task-specific and only relevant to the specific task being manipulated. Finally, Ployhart and Bliese express concern about the fact that research frequently addresses different "explanatory" variables that are adaptive in nature, again suggesting these variables may be limited to specific contexts: "Wanberg and Banas (2000) use openness to change, Judge, et al. (1999) use coping, Brown (2001) uses learner choices, Lovett and Schunn (1999) use strategy selection, and so on" (p 12), but these strategies often result in findings that are context and criterion specific (2006). Ultimately, Ployhart and Bliese conclude that, "What is missing from current research is

a broad-based understanding of the determinants and consequences of individual differences in adaptability" (2006, p 12).

**A different perspective.** Although the review provided by Ployhart and Bliese (2006) was helpful in exploring some of the details within the literature, their critique seemed to debase much of what they summarized. This is sometimes justified by an actual weakness in the literature and can also be a useful strategy to provide support for establishing need for a new model, but it appears that the conclusions they reached were somewhat hasty in several ways. They concluded that the literature simply reinforced their argument for needing to develop a broad-based understanding of the determinants of adaptability and then implied that it was otherwise not of much use.

Despite Ployhart and Bliese's (2006) suggestion that this research is not especially useful, there may be evidence to the contrary. One of the biggest criticisms Ployhart and Bliese (2006) offered is that the research findings had a tendency to be criterion and context specific, often as a result of exploring "explanatory" variables that are adaptive in nature. These variables, although related to adaptability, are referred to by other names and are conceptualized in unique ways. Instead of viewing this research as dismissible, it can actually be viewed as a valuable contribution toward developing a "broad-based understanding of the determinants of adaptability." In other words, because these explanatory variables have been identified as adaptive in nature, it seems reasonable and logical to conclude that they may in fact be representative of some of the various underlying components of adaptability and are at least worth considering.

Consequently, the following review is organized according to different trends in the literature. In identifying theses patterns the first consideration made was both how adaptability has been defined as well as how it has been conceptualized. There are some hints within the literature in which these trends have been explicitly described in certain publications. For example, Laycock (1929) suggested cognitive, emotional, and conative factors of adaptability. Ployhart and Bliese even suggested some areas to consider, including cognitive ability, certain personality traits, preferences, and stress and coping skills (2006, p 14). These categories have been demonstrated to be most relevant to adaptability based on the literature.

***Cognitive factors.*** The first category to be discussed is that of the cognitive factors that have been identified as contributors to adaptability or that have general support for their being adaptive in nature. One domain with support in this area is that of learning. In this case, adaptation is considered the ability to generalize and transfer knowledge in new or changing situations (Baldwin & Ford, 1988). Problem solving, another cognitive ability, has been linked to adaptability as well (Tallman, 1961). The use of strategy selection, related to problem solving, has been linked to awareness and working memory capacity (Lovett & Schunn, 1999). LePine, Colquitt, and Erez (2000) demonstrated that individual differences in cognitive ability resulted in stronger effects during task changes. Also linked to problem solving are the cognitive features of adaptability evidenced by Pulakos, et al's (2000) factor analysis, which identified factors of solving problems creatively and learning work tasks, technology, and procedures. Similarly, though without the empirical support of Pulakos, et al (2000), Herr (1993)

proposed that problem recognition and definition, handling evidence, analytical skills, skills of implementations, and learning skills are all components of personal flexibility.

In a meta-analysis of psychological flexibility research, 27 studies linked psychological flexibility to mental health, job satisfaction, and job performance (Hayes, Luoma, Bond, Masuda, & Lillis, 2006, in Bond, Flaxman, & Bunce, 2008). Finally, leadership, presumed to be associated with adaptive behavior, has been significantly predicted by behavioral and cognitive flexibility (distinct constructs) above and beyond social skills and academic ability (Reiter-Palmon, 2003). This speaks to the importance of cognitive factors in addition to social or interpersonal factors in this domain of research. Cognitive flexibility has also been demonstrated to be higher in bicultural individuals, which suggests that it may be related to the cultural adaptability identified by Pulakos, et al (2000). Although this summary contains a wide breadth of information, it serves to establish a consistent trend of cognitive factors predicting or being associated with adaptability.

***Social or interpersonal component.*** Demonstrating interpersonal adaptability and demonstrating cultural adaptability, dimensions of Pulakos, et al's (2000) factor analysis, have been identified as important to adaptability, as have human relations in Herr's (1993) model of personal flexibility. All of these factors share a social conceptual overlap. One social construct that has been investigated for a number of years is that of social intelligence, with one currently popular model identifying it as a combination of social awareness (comprised of primal empathy, listening, and social cognition) and social facility or relationship management (including synchrony, self-presentation,

influence, and concern) (Goleman, 2006). Successful leaders have been demonstrated to possess two particular qualities of social intelligence, including social perceptiveness and behavioral flexibility (Zaccaro, Gilbert, Thor & Mumford, 1991). Also falling within the social category of adaptability are social skills and social competence, which has been associated with good adjustment, flexibility, emotional maturity, and prosocial behavior (Zupancic & Kavcic, 2003).

***Emotional or intrapersonal component.*** The third category of adaptability identified as a trend in the literature is an emotional or intrapersonal component. Coping is included within this category, as it is addressed by Ployhart & Bliese (2006), as well as Pulakos and colleagues (2000). Specifically, Pulakos et al. (2000) showed support for factors of handling emergency/crisis situations, handling work stress, and dealing with uncertain and unpredictable work situations. Coping mediates effects of stressors on various dependent measures (Lazarus & Folkman, 1984; Pearlin & Schooler, 1978; Pearlin, Menaghan, Lieberman and Mullen, 1981), which makes it especially relevant to situations requiring adapting to a stressful environment. Coping theory has acknowledged active and passive coping styles (Taylor & Aspinwall, 1996), as well as a distinction between problem-focused and emotion-focused coping strategies (Pearlin & Schooler, 1978). Emotion-focused coping strategies can be linked conceptually to emotional intelligence, which has been described by Mayer, Salovey, and Caruso (2002), as a combination of perceived emotions, facilitating thoughts, understanding emotions, and managing emotions. A slightly different approach to emotional intelligence has explicitly included stress management in the model (Bar-On, 2006).

***Personality component.*** Zupancic & Kavcic (2003) state simply that personality predicts general adaptation, and the trend in the literature appears to support this claim. Adaptability sometimes appears as a dimension of personality, and is defined by McDonnell and Beck (1986) as the ease with which an individual's responses are modified in desired directions as a result of new or altered situations. In contrast, Thomas, Chess, Birch, Hertzig, & Korn (1963) identified an adaptability dimension of temperament that can be best described as how quickly an individual adjusts to a new situation. Another commonly accepted theory of personality has identified five primary dimensions of personality, which do not explicitly contain "adaptability" (e.g. Costa & McRae, 1992; Goldberg, 1993), but these "Big Five" dimensions have been identified as relevant to, and in some cases predictive of, adaptability and adaptive performance (e.g. Costa & McRae, 1992; McCrae & Costa, 1989).

For example, LePine, Colquitt, and Erez (2000) demonstrated that individual differences such as openness and conscientiousness produced stronger effects in changing tasks than in tasks that were familiar. Furthermore, dispositional antecedents—including locus of control, generalized self-efficacy, self esteem, positive affectivity, openness to experience, tolerance for ambiguity, and risk aversion—have been shown to predict scores on a measure of coping with organizational change (Judge, Thoresen, Pucik, & Welbourne, 1999). Other research investigating the Big Five dimensions of personality have shown that Openness and Conscientiousness predicted adaptation to a school environment (Reed-Victor & Pelco, 2001, in Zupancic & Kavcic, 2003), and that they are associated with transactional and transformational leadership (Bono & Judge, 2004, in

Fugate & Kinicki, 2008) and job performance (Thoresen, Bradley, Thoresen, & Bliese, 2004).

These categories are not intended to be comprehensive explanations or descriptions of the entire field of adaptability research; however, they are intended to demonstrate general trends in the literature and establish the relevance of each category to predicting adaptability or adaptive outcomes. These categories are consistent with many of the KSAOs identified by Ployhart and Bliese (2006), as well as compatible with seven of the eight dimensions of adaptability identified by Pulakos, et al. (2000), including solving problems creatively, dealing with uncertain and unpredictable work situations, learning work tasks, technologies, and procedures, demonstrating interpersonal adaptability, demonstrating cultural adaptability, handling work stress and handling emergency or crisis situations.

Based on the consistencies among the broad adaptability literature, I-ADAPT theory, the taxonomy of adaptive job performance, and these four general categories, it is fair to at least consider the possibility that these four components of the adaptability literature—cognitive, social, emotional, and personality—may in fact be four components of adaptability. There appears to be a degree of convergence around these areas in the literature, and thus it is reasonable to propose that they are a good place to start in attempting to identify the individual characteristics related to adaptability.

**Guiding Framework**

The previous discussion concludes with the proposal of a general set of components of adaptability. Unfortunately, the way in which these components relate to

each other and to adaptability in general has for the most part been ignored. In the I-ADAPT model, for example, the authors propose a hierarchical structure of adaptability with eight lower-order latent dimensions representing different types of adaptability. Regarding individual characteristics that relate to adaptability, however, there is an acknowledgement of a relationship, but there is an absence of any sort of explanation pertaining to the nature of how these individual characteristics relate to each other and how they relate to adaptability. Such is the case for all of the models reviewed. Consequently, one must turn to frameworks outside the realm of adaptability to identify a potential structure for the variables in question. Past research has established a number of models and structures describing individual differences, but one of the most popular and well-researched models is the hierarchical structure of intelligence, specifically, the Cattell-Horn-Carroll (CHC) model of intelligence.

Prior to the establishment of CHC theory, there was much controversy and debate in the field over the structure of intelligence, similar to the confusion that surrounds the current understanding of adaptability. There were two popular schools of thought—one supporting a general factor of intelligence and the other supporting multiple factors of intelligence. The general factor perspective can be represented by the "general *g*" theory (e.g. Spearman, 1927), which was supported by what Spearman called "positive manifold," or the fact that all tests that require some form of mental effort to complete correlate positively with each other (assuming scoring is similar). The opposing view can be represented by Thurstone's (1935) "primary mental abilities" theory, which supported the presence of eight primary mental abilities and no general *g* factor. This

multidimensional view is similar to the structure inherent in the taxonomy of adaptability identified by Pulakos et al. (2000), in the sense that there are multiple types of adaptability, which, according to Pulakos and colleagues, presumably require distinct individual characteristics.

Ultimately, Cattell-Horn Gf-Gc theory (Horn & Noll, 1997) was combined with Carroll's (1993) three-stratum theory to form CHC theory. This model proposes a three-level structure of intelligence (Carroll, 1993), with a general over-arching intelligence factor, a number of "broad abilities" at the second-order factor level, and "narrow abilities" at the first-order level. See Figure 3 for a simplified depiction of the CHC model. The triarchic structure is accurate, but the number of broad and narrow abilities was minimized due to limited space.

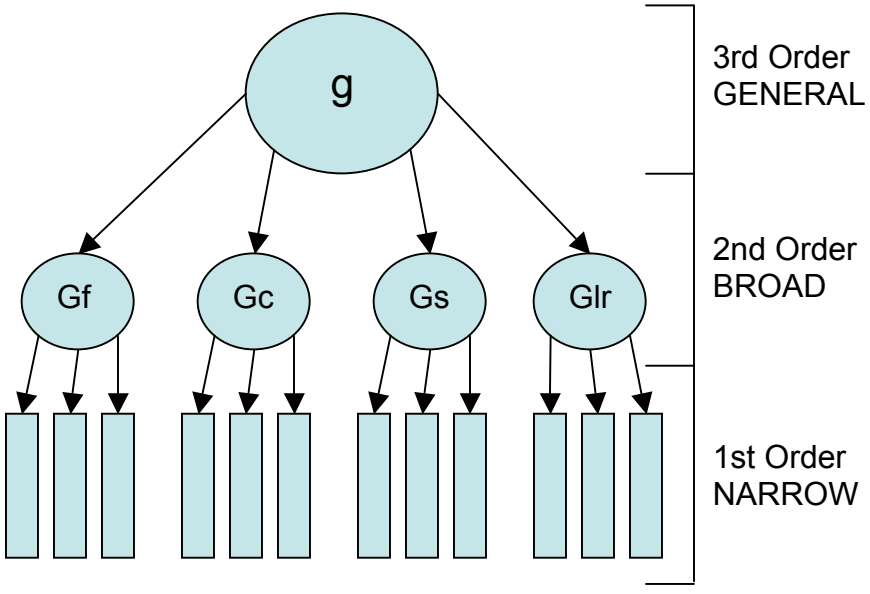



Figure 3: Cattell-Horn-Carroll Hierarchical Model of Intelligence—Simplified (Carroll, 1993)

Interestingly, the "compromise" of CHC theory appears to fit adaptability as well. The general definition of adaptability lends itself to being comparable to general intelligence, while at the same time, the individual characteristics proposed in I-ADAPT theory may be organized and function much like the broad abilities of intelligence. In other words, the same composite of individual characteristics may be involved or available in all situations requiring adaptability, but the degree to which each particular characteristic is "tapped" will vary depending on the nature of the situation. In applying this framework to the findings of Pulakos, et al. (2000), rather than each situation requiring a specific skill set, the same skill set will be used across situations, resulting in unique profiles or composites of these skills for each context.

In sum, a variety of evidence to support the use of this framework exists, including the following. Firstly, there is a plethora of research supporting this structure. Secondly, because adaptability has been conceptualized as a type of intelligence and is still considered by some an adequate definition of intelligence, a comparable model of intelligence seems especially relevant. Finally, the model makes intuitive sense based on the previously identified trends in the literature, and fills a hole left by current models of adaptability.

**Integration: Toward a New Model**

By applying the trends in the literature to various aspects of the aforementioned definitions, conceptualizations, and models, a new model of adaptability naturally emerges. CHC Theory provides a hierarchical framework, with specific indicator variables providing insight into the relationship among latent variables, and ultimately an

overarching construct. Laycock's (1929) "adaptability to new situations" supplies a foundation for the important components, starting with cognitive, emotional, and conative factors. Pulakos and colleagues (2000) provide an empirically supported model of the dimensions of adaptability, and the trends in the literature appear to support a pattern of cognitive, social, emotional, and personality components. These components are consistent with the KSAOs proposed in the I-ADAPT model as well, providing further support for their being a good starting point for exploring the components of adaptability.

In proposing a model of adaptability as a composite of individual characteristics across a variety of contexts, the limitations of much of the existing research can be overcome. Firstly, the proposed model will not be context-specific, as much of the existing research tends to be (Ployhart & Bliese, 2006). Additionally, the proposed model will be explored empirically, and thus will have at least some degree of empirical support, or will have empirical support to provide a grounds for adjustment in future research. Finally, the proposed model meets a current demand in the literature for a broad-based understanding of individual differences in adaptability (Ployhart & Bliese, 2006). Pulakos and colleagues (2000) laid some foundation in the area, but the time for exploring the knowledge, skills, abilities, and other characteristics underlying adaptability is now (Ployhart & Bliese, 2006).

The proposed model is consistent with much of what has already been established, in that adaptability had already been identified as an individual characteristic with multiple underlying components. A review of the relevant literature provided a place

to begin exploring potential underlying components as well as how they might be organized. As this is a preliminary investigation, the four general trends identified in and supported by the literature seemed to have sufficient evidence to be considered adequate areas to represent the components of adaptability.

With regard to the structure of the model, the framework is very similar to the hierarchical CHC model depicted previously. There are four levels of variables, ranging from very narrow, single constructs to specific composite variables to the more general components discussed in the literature review—cognitive, social, emotional, and personality—to the highest order factor of adaptability. Model 4, in Appendix E provides a depiction of the model. The following proposed research study will explore whether the proposed model has empirical support.

## Chapter 3: Proposed Research Study

### Statement of Problem

Despite over one hundred years of relevant research, an adequate model of adaptability does not exist in the literature. The literature is so extensive and lacking in consensus that even identifying an adequate definition of adaptability is a challenge. Although many models have been proposed, they have varying shortcomings ranging from limited scope, to restricted contexts, to a lack of empirical support. Emphasis on the importance of individual characteristics and their influence on adaptability is common in the literature, and the need for a broad-based, comprehensive model of adaptability with empirical support is clear. Because the types and contexts of adaptability have already been established in the literature, the next logical step in exploring the construct is to clarify the individual characteristics that contribute to adaptive behavior and how they relate to each other.

### Statement of Purpose

The purpose of the current study will be to conduct a preliminary investigation of the potential underlying factors associated with adaptability in order to contribute to the creation of a new, more comprehensive, broad-based model of adaptability. Specifically, using Confirmatory Factor Analysis (CFA), multiple models of adaptability will be explored to both better understand the relationship among the proposed individual components of adaptability and to explore whether these components measure an overarching construct of adaptability. Four general constructs have been selected for this preliminary analysis, as they are hypothesized to be relevant to the construct of

adaptability and have multiple existing measures with adequate psychometric data. These categories include cognitive flexibility/problem solving, emotional intelligence, social intelligence, and personality. Due to the nascent nature of the construct under investigation, the author acknowledges that the model may not be complete at this time and recommends future research to investigate other potential components of adaptability.

## Method

**Participants.** Upon receiving IRB approval for the use of human subjects, participants will be recruited from a large group of undergraduate students at a large, public university who have been included in the research subject pool through their enrollment in specific psychology or education courses. Although using this population may limit the generalizability of the results due to educational and socioeconomic factors, the use of college-age students is acceptable in this case as much of the research in the field uses populations this age or older, and the measures to be used in the study were all normed on individuals in this age group or older. The demographics of the participants will be representative of the total US population with regard to sex and ethnicity. SES data will also be collected to identify any potential group differences across measures.

Hutcheson and Sofroniou (1999) recommend a sample size of 150-300 for a factor analysis, and Gorsuch (1983) recommends at least 200 cases. Consequently, 250 participants will be recruited for this study in order to ensure that a minimum of 200 cases will be met. With a subjects-to-variables ratio of approximately nine (250 subjects,

26 measured variables), the format is also consistent with Bryant and Yarnold's (1995) recommendation that the subjects-to-variables ratio be no lower than five. Every participant will complete all measures. In the event of missing data, maximum likelihood estimation will be used, as maximum likelihood methods are acknowledged to be superior to other methods of dealing with missing data (Arbuckle, 1996).

**Instrumentation.** Multiple measures will be included so as to provide adequate coverage of the desired indicator variables. The measures are organized similarly to the literature review, with categories of cognitive flexibility/problem solving, emotional intelligence, social intelligence, and personality.

The Cognitive Flexibility Scale (CFS): The CFS (Martin & Rubin, 1995) is a self-report measure of cognitive flexibility. In this case, cognitive flexibility refers to three aspects 1) an individual's awareness that there are alternatives and options available in any situation, 2) willingness to be flexible and adapt to the situation, and 3) self-efficacy in being flexible. The CFS contains twelve Likert items (1:*strongly disagree* to 6:*strongly agree*), for example, "I can communicate an idea in many different ways" and "I can find workable solutions to seemingly unsolvable problems." With regard to construct validity, the CFS has demonstrated significant positive correlations with measures of communication flexibility and significant negative correlations with measures of attitude rigidity (Martin & Rubin, 1995). Martin and Rubin (1995) reported additional evidence of correlations between CFS scores and measures of interpersonal attentiveness, perceptiveness, responsiveness, self-monitoring, and unwillingness to communicate. Measures of internal consistency have been acceptable, including

coefficient alphas of .76 and .77 across three samples (Ahn, Kim, & Park, 2008; Martin & Rubin, 1995). Scores on the CFS appear relatively stable, with a coefficient of stability of .83 over a one-week period (Martin & Rubin, 1995).

The Problem Solving Inventory (PSI): The PSI was developed by Heppner and Peterson (1982) to provide a global appraisal of an individual as either an effective or non-effective problem-solver (Heppner 1988, Heppner & Baker 1997). The measure consists of 35 Likert-type items (ranging from 1 to 6), with three subscales, including 1) problem-solving confidence (PSC), 2) approach-avoidant style (AA), and 3) personal control (PC). Lower total scores indicate more positive appraisal of problem solving, and lower scores on the subscales are indicative of more self-confidence, personal control, and an approach rather than avoidance style. Consequently, these scales were reverse-scored after administration in order to be consistent with direction of the other measures used in the model. Internal consistency ratings for the entire measure are reported at .90, and range from .72-.85 for the subscales. Test-retest reliabilities range from .83-.89.

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT): The MSCEIT (Mayer, Salovey, & Caruso, 2002) is a self-report measure of emotional intelligence. The measure includes four composite scores assessed by two tasks each, resulting in eight subscales. Internal consistency reliabilities for the eight task scores ranged between .64 and .88 (mean = .71), and test-retest reliability estimate for the MSCEIT total score was .82 (N = 62). Adequate validity data exists, as does data from a factor analysis, which supports the four-factor structure. The following represent the structure of the composites scales and their associated subtests:

- Perceiving Emotions (PE): Face Task and Picture Task
- Facilitating Thought (FT): Sensation Task and Facilitation Task
- Understanding Emotions (UE): Blends Tasks and Changes Tasks
- Managing Emotions (ME): Emotion Management Task and Emotional Relations Task

The Bar-On Emotional Quotient Indicator (EQ-i): (Bar-On, 2006) is designed to measure emotional intelligence, in this case defined as one's ability to manage and discriminate emotions and feelings of self and others and to use emotional information to guide thinking and actions (Salovey & Mayer, 1989). Responses are indicated via a 5-point Likert scale (1:*very seldom* to 5:*very often true of me*). The measure is comprised of 5 composite scales, each with multiple subscales. For the purposes of assessing social intelligence, only the subscales pertaining to the Interpersonal Composite will be included. The composite is designed to measure social awareness and interpersonal relationships through three subscales: 1) empathy, 2) social responsibility, and 3) interpersonal relationships. Higher scores indicate more success with social awareness and interpersonal relationships. Internal consistency reliability estimates average .76, and average test-retest coefficients are .85 and .75 for 1- to 4-month time periods. The validity information is generally adequate according to the MMY; however, one limitation is that some validation procedures do not include North American samples.

The Social Skills Inventory, Research Edition (SSI): The SSI (Riggio, 1989) is a self-report measure comprised of 90 Likert-type items structured on a 5-point scale. The test is intended to measure social communication skills according to expressivity,

sensitivity, and control on two distinct dimensions, emotional and social. For the purposes of the current study, only items relevant to the social dimension of 1) expressivity, 2) sensitivity, and 3) control will be administered and assessed. Test-retest reliabilities of the separate scales range from .81 to .96 over a two-week period, and alpha coefficients range from .62 to .87. Data presented regarding convergent and discriminant validity (Riggio, 1989) provide adequate support for the scale.

The Big Five Inventory (BFI): The BFI is a 44-item test, developed by Benet-Martinez and John (1998), designed to measure five dimensions of personality: Conscientiousness, Agreeableness, Emotional Stability, Extroversion and Intellect or Openness. Due to the relevant findings discussed in the literature review, only 1) Agreeableness, 2) Conscientiousness, and 3) Openness will be assessed for the purposes of this study. Sample items include, "I have a vivid imagination," "I am exacting in my work," and "I feel comfortable around people." Alpha reliabilities range from .75 to .90 and average above .80, and test-retest reliabilities over a period of three months range from .80 to .90, with a mean of .85. Substantial evidence for convergent and divergent validity has also been established.

The New York Longitudinal Scales Adult Temperament Questionnaire (ATQ): The ATQ is a self-report measure designed to assess nine temperaments, including Activity Level, Regularity, Adaptability, Approach to Novelty, Emotional Intensity, Quality of Mood, Persistence, Distractibility, and Sensory Sensitivity. The entire test is comprised of 54 Likert-type items on a 7-point scale (1:*Hardly ever* to 7:*Almost always*). There are nine temperament indices derived from the measure, but for the purposes of

this study, only the ratings for the subscales of 1) Adaptability, 2) Approach to Novelty, and 3) Regularity will be assessed. Sample items include, "I prefer a hobby which has a lot of…", "If someone messes up my room or apartment I get very angry…", and "People think I am a cynic because…" Alpha reliability coefficients range from .69 to .83, and test-retest reliabilities over one month varied from .66 to .90 across categories. Although the standardization sample was small, the manner in which the measure has been developed up to this point appears to be of good quality.

For a summary of each measure and its subscales, please refer to Appendix A.

**Procedure.** Upon IRB approval for the use of human subjects, 250 participants will be recruited for involvement in the proposed study. Each of the aforementioned measures will be administered in random order during three sessions over the course of four days. The counterbalancing provided by the random order of administration should prevent any order effects, and the use of relatively short testing sessions spread out over four days should prevent fatigue from being a potentially relevant confound. Students will be required to complete a demographic survey upon completion of all measures.

***Analyses.*** The study will consist of two parts: Part A will focus primarily on the factor structure of the lower-order factors and the indicator variables, while Part B will focus on whether the data support a hierarchical model with an overarching adaptability factor. Both parts will use Confirmatory Factor Analysis (CFA) to explore proposed models of adaptability and to compare these models. Typically in CFA, previous research and relevant theory are used to develop a model of latent factors underlying a variable(s) of interest. The model is then "run" through structural equation modeling software, and

subsequently fit indices are examined to get feedback regarding the "adequacy of the model in explaining the data" (Keith, 2006, p 306). Fit indices are also used when comparing competing models, though the specific indices used vary based on certain model characteristics.

To be more specific regarding the proposed study, descriptive statistics and internal consistency reliabilities of scores will be calculated, with a minimum Chronbach's alpha of .70 required to establish adequate reliability estimates. Confirmatory factor analysis will be conducted in order to evaluate the appropriateness of a hierarchical model of adaptability. Several fit indices will be computed. The chi-square statistic and degrees of freedom will be reported, as will the change in chi-square when comparing nested models; however, due to the fact that large sample sizes can produce significant chi-square statistics (Keith, 2006), other fit statistics will be evaluated as well. Keith (2006) recommends using the Root Mean Standard Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Goodness of Fit Index (GFI) as additional measures of the fit of a single model. Hu and Bentler (1999) recommend using the SRMR and supplementing it with one additional fit index, including the TLI and CFI, among others. Thus for the purposes of this study, for single models the chi-square statistic, RMSEA, SRMR, and CFI will all be reported.

RMSEA is a measure of misfit per degree of freedom (Keith, 2006), with a cutoff of .05 or less recommended to indicate a close fit, and a range of .05 to .08 indicating fair

fit (Browne and Cudeck, 1993). The SRMR can be described as "conceptually equivalent to the average difference between the actual correlations among measured variables and those predicted by the model" (Keith, 2006, p 270). A cutoff of .05 for the SRMR is recommended as an indicator of good fit (Hu & Bentler, 1999). Lastly, the Comparative Fit Index (CFI) compares fit of existing model with the null/independent model. Although not completely independent of sample size, the CFI is much less affected by it than chi-square (Keith, 2006). A CFI greater than .95 indicates good fit, while greater than .90 indicates adequate fit (Hu and Bentler, 1999).

Additional fit statistics are recommended for comparing competing models. For nested models, chi-square change is an adequate test to determine whether fit has improved significantly. The chi-square change will be reported in addition to those fit indices recommended for use with a single model.

*Part A*. The initial model (Model 1, Correlated Model) for Part A consists of twenty-six indicator variables and ten latent variables, representing each measure and its corresponding subscale or items. To be clear, each indicator variable represents the measurement of a single construct. As proposed in the literature review, some of the first-order latent variables appear to be related to each other, which suggests that they have shared variance or should be correlated, as they are in the model. A depiction of this model can be viewed in Appendix B.

The first step in establishing the relationship among these variables is to determine whether the correlations among the second-order factors are due to a common overarching pattern or if they are simply due to some shared variance that is unexplained by the model. To do this, Model 1 is compared to Model 2 (Third-order Model, See Appendix C). Because these are nested models, the chi-square change will indicate whether the model fit has improved. If the model fit does improve significantly, then Model 2 will be used in the next step of the analysis. If model fit does not improve significantly, it may be indicative of any number of problems, including but not limited to inaccuracy or inconsistency in measurement or perhaps a flaw or flaws in the proposed theory. If model fit does improve significantly according to chi-square but is still not "good" according to the selected fit indices, this simply provides more support for altering the model further. If model fit has already been established as adequate or good, the results will not be affected unless fit gets significantly worse as a consequence of model alterations.

If the change in chi-square does show improved fit, then Model 2 will be the final model for Part A.

*Part B*. The second part of the study will explore the hierarchical structure of the model with regard to an over-arching construct of adaptability, beginning with the Final Model from Part A (Model 2, Third Order Model), as it will have the most support thus far. The same processes from Part A will essentially be replicated, except this time the

latent variables being related to each other are third-order variables, and the over-arching adaptability construct will be a fourth-order factor. Thus, the process repeats itself.

The first step of Part B will be to compare the Final Model from Part A to Model 3 (Third-order, Correlated Model, See Appendix D). Again, the chi-square change will be used to determine whether model fit improves significantly. If so, Model 3 (Third-order, Correlated Model) will then be compared to Model 4 (Fourth-order, Hierarchical Model). The change in chi-square from this final analysis will determine whether the over-arching construct of adaptability is appropriate.

***Expected results.*** It is expected that the results will demonstrate adequate internal consistency reliabilities—a Chronbach's alpha of .70 or greater—for scores on each subscale. Expected results for the confirmatory factor analyses will demonstrate that the model comparisons will indicate better fit for the models supporting a hierarchical structure of adaptability. In this sense, model fit is expected to improve significantly with each alteration, until a four-level hierarchical model has been established, with good fit and as superior to other models considered. This would provide support both for a composite adaptability construct as well as for the proposed underlying components of adaptability. To be more specific, results for Part A are expected to support the presence of the proposed four broad components—the emotional component, the social component, the cognitive component, and the personality component. Results for Part B are expected to establish support for the proposal that these are in fact components underlying an over-arching construct of adaptability.

# Chapter 4: Discussion

## Summary

Although there is a plethora of research pertaining to adaptability, an adequate model of adaptability does not exist. There is some degree of consensus regarding the importance of individual characteristics and their influence on adaptability, and the literature contains a number of proposed models, but each of them has significant limitations. The purpose of this proposed study is to work towards overcoming some of these limitations by proposing a model of adaptability based on trends in the literature and then testing it empirically. This study proposes a hierarchical model of adaptability, with four specific individual characteristics underlying the over-arching construct. If the results of this analysis provide support for the proposed model, the field of adaptability research will be one step closer to establishing an adequate model.

## Limitations and Future Research

The proposed study is not intended to be the conclusive step to developing an adequate understanding of adaptability, but rather it is designed to be a preliminary step in a larger process. Consequently, there are a number of limitations to be addressed, as well as areas of future research to be acknowledged.

To begin, the proposed model is not a complete model of adaptability. There may be other relevant factors that were not included in the proposed analysis. For example, the roles of motivation and general intelligence may be important for behaving adaptively. Additionally, the physical aspect of adaptability identified by Pulakos, et al. (2000) is not included in the proposed model. These factors go beyond the scope of the proposed

study, but they should be investigated in future research. Furthermore, this model focused only on individual characteristics—the characteristics of the environment or the situation were not taken into account. Future research should explore how individual characteristics vary across specific contexts, as well as how they interact with characteristics of the environment to either enhance or inhibit adaptive behavior.

An additional limitation to the proposed study relates to the scales selected for measurement. Including four levels of factors was not an evidence-based decision supported by theory or the literature, but rather an artifact of the measures used to collect the data. Specifically, in locating measures with adequate psychometric support and norms appropriate for the same population that were also related to the general categories of interest, options were limited to fairly complex measures, many with multiple composite scales. Consequently, the model had to reflect the complexity of the measures. Furthermore, although all of the measures have demonstrated a degree of psychometric soundness, a few of the measures could benefit from more extensive validity and reliability research. Future research should focus either on improving the psychometrics for these particular measures, or on developing a measure designed specifically to assess the proposed components. The measures also limited this proposal to a certain population, as they were all normed on college-age individuals or older. Thus, evaluating adaptability in children was not a viable option for the proposed study; however, exploring the construct further with a younger population is important as it may help better understand the development of adaptability.

After establishing a comprehensive model of adaptability, the investigation of potential cross-cultural differences and gender differences may also be a worthy pursuit. Longitudinal studies to explore the development of adaptability over time may also prove helpful in attempting to better understand the construct and may also be used to inform a treatment or intervention plan designed to improve an individual's adaptability.

**Implications**

As already stated, the proposed study is intended only to be a preliminary step in identification and exploration of a model of adaptability. However, a number of benefits may result as a consequence of gaining a better understanding of adaptability. For example, it may help to develop better measures of adaptability, or be used to inform diagnosis, guide therapy, or enhance staff or individual development. Ultimately, adaptability is related to virtually every aspect of human life. The work environment is changing for many people as flexibility in jobs increases. This, paired with the persistent development of new technology, requires individual to constantly adapt in the workplace. As the number of immigrants in the United States increases, the need for adaptability of both the newcomers and Americans increases as well. With divorce rates over fifty percent, individuals must frequently learn to adapt to changing family environments. In short, adaptability is simply too relevant to ignore in psychological research.

Appendix A: Summary of Measures and Subscales

*Cognitive Flexibility Scale (CFS):*

- Awareness that there are alternatives and options available in any situation
- Willingness to be flexible and adapt to the situation
- Self-efficacy in being flexible

*Problem Solving Inventory (PSI):*

- Problem-solving confidence
- Approach-avoidant style
- Personal control

*Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT):*

- Perceiving Emotions (PE): Face Task and Picture Task
- Facilitating Thought (FT): Sensation Task and Facilitation Task
- Understanding Emotions (UE): Blends Tasks and Changes Tasks
- Managing Emotions (ME): Emotion Management Task and Emotional Relations Task

*Bar-On Emotional Quotient Indicator (EQI)*:

Interpersonal Composite: social awareness and interpersonal relationships through three subscales

- Empathy
- Social responsibility
- Interpersonal relationships

*Social Skills Inventory (SSI):*

- Social expressivity
- Social sensitivity
- Social control

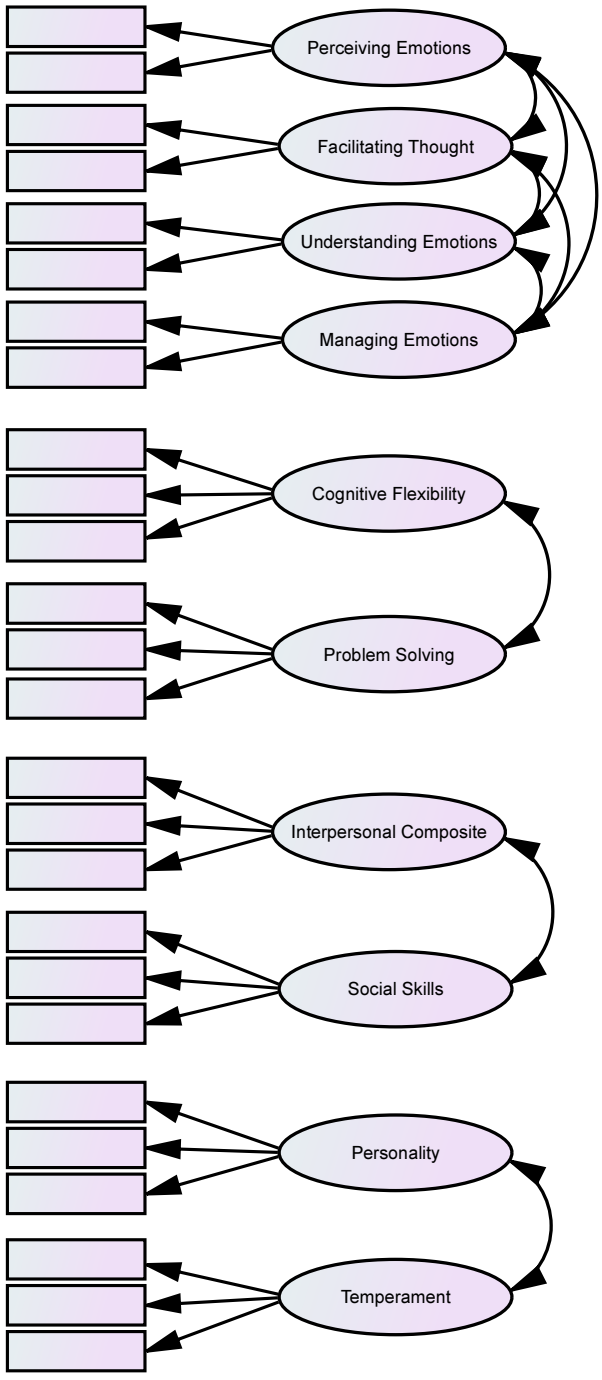
*Big Five Inventory (BFI)*

- Agreeableness
- Conscientiousness
- Openness

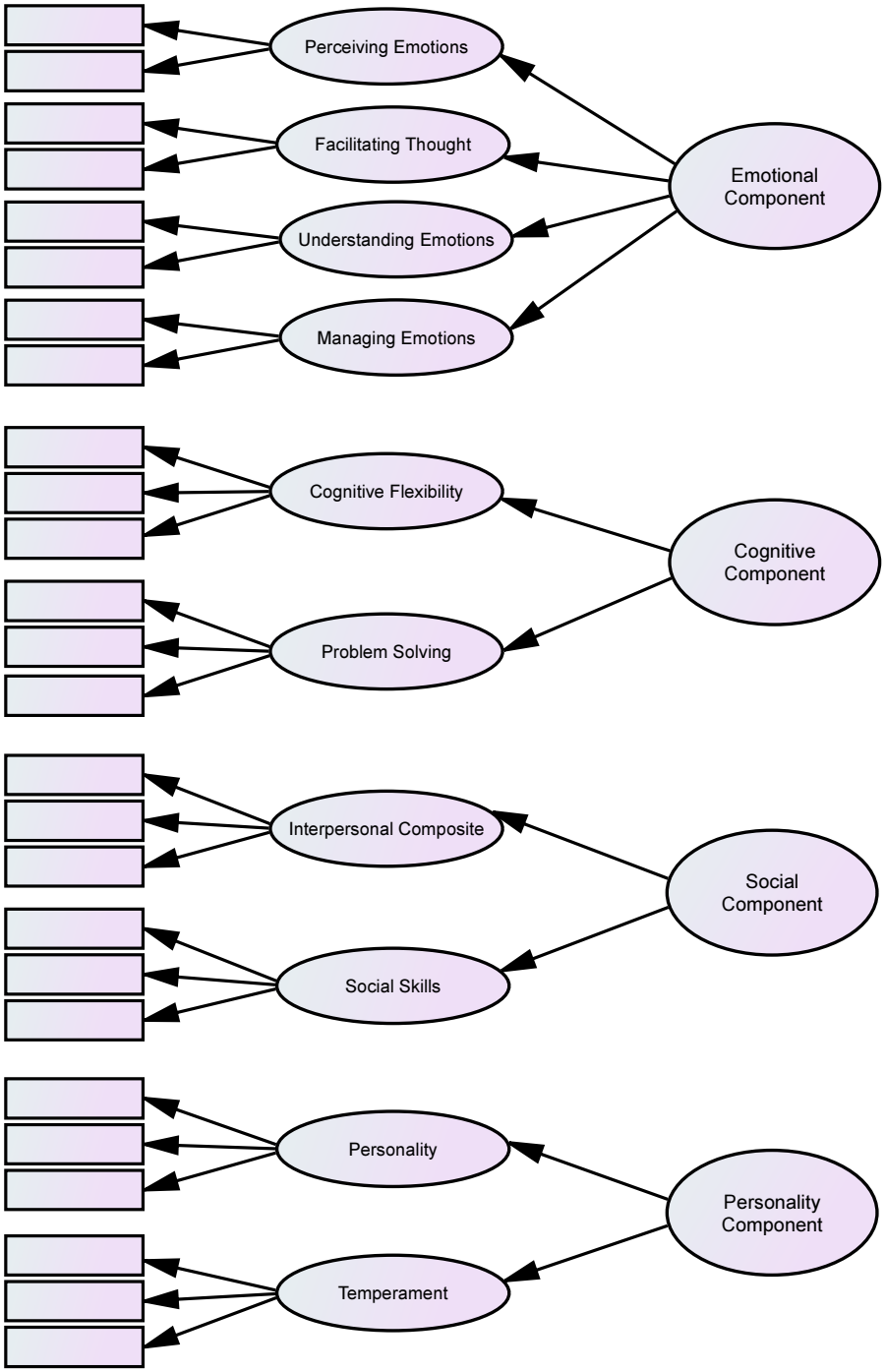
*New York Longitudinal Scales Adult Temperament Questionnaire (ATQ):*

- Adaptability
- Approach to Novelty
- Regularity

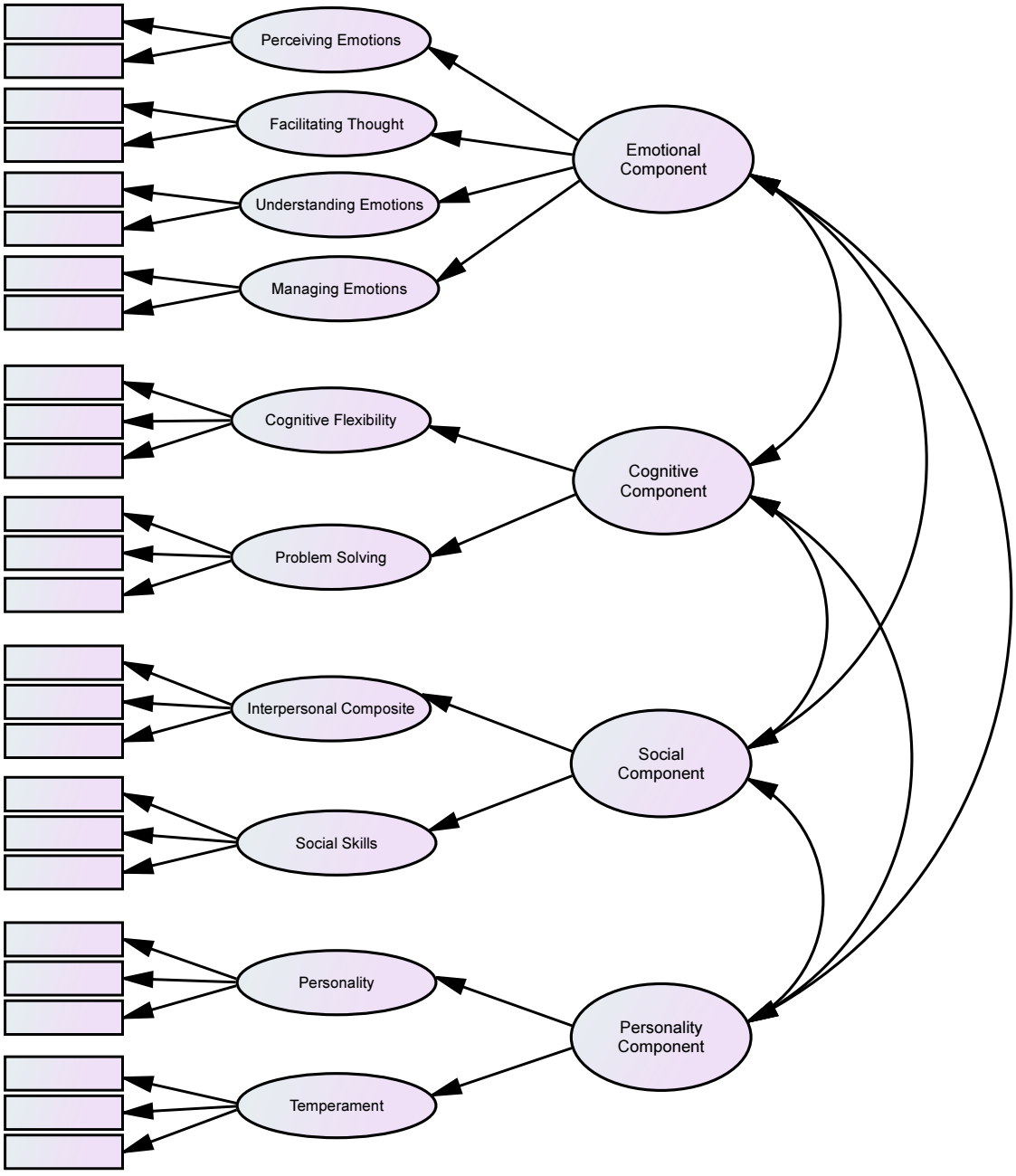
Appendix B: Model 1, Second Order Correlated Model



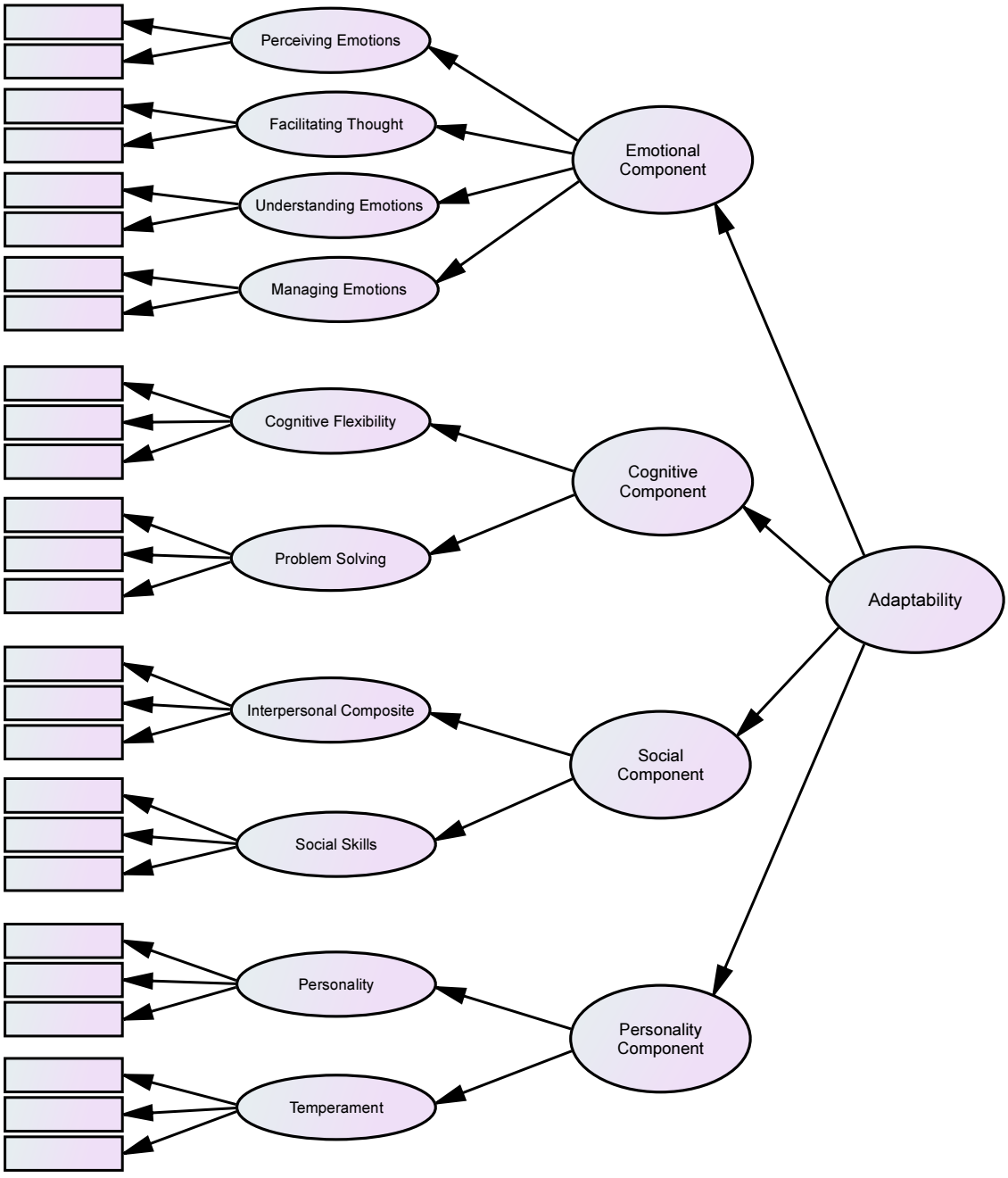
Appendix C: Model 2, 3rd Order Model



Appendix D: Model 3, 3rd Order Correlated Model



Appendix E: Model 4, 4th Order Hierarchical Model



References

Ahn, A.J., Kim, B.S.K. & Park, Y.S. (2008). Asian cultural values gap, cognitive flexibility, coping strategies, and parent-child conflicts among Korean Americans. *Cultural Diversity and Ethnic Minority Psychology, 14,* 353-363.

Arbuckle, J.L. (1996). Full information estimation in the presence of incomplete data. In G.A. Marcoulides & R.E. Schumacker (Eds.), *Advanced structural equation modeling* (pp. 243-278). Mahwah, NJ: Erlbaum.

Baldwin, T.T. & Ford, J.K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology, 41,* 63-105.

Bar-On, R. (2006). The Bar-On model of emotional-social intelligence (ESI). *Psicothema, 18,* 13-25.

Benet-Martínez, V. & John, O.P. (1998). Los Cinco Grandes across cultures and ethnic groups: Multitrait method analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology*, 75, 729-750.

Boardman, R.K. (1934). The transition from home to school. *Journal of Educational Sociology, 7,* 371-378.

Bond, F.W., Flaxman, P.E. & Bunce, D. (2008). The influence of psychological flexibility on wrok redesign: Mediated moderation of a work reorganization intervention. *Journal of Applied Psychology, 93,* 645-654.

Bono, J. E., & Judge, T. A. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology, 89,* 901–910.

Fugate, M. & Kinicki, A.J. (2008). A dispositional approach to employability: Development of a measure and test of implications for employee reactions to organizational change. *Journal of Occupational and Organizational Psychology, 81,* 503–527.

Bretz, R. D., & Judge, T. A. (1994). Person-organization fit and the theory of work adjustment: Implications for satisfaction, tenure, and career success. *Journal of Vocational Behaviour, 44,* 32–54.

Brown, K.G. (2001). Using computers to deliver training: Which employees learn and why. *Personnel Psychology, 54,* 271-296.

Browne, M., & Cudeck, R. (1993). Alternative ways of assessing model fit. *Sociological Methods and Research, 21,* 230–258.

Bryant, F. B., & Yarnold, P. R. (1995). Principal-components analysis and exploratory and confirmatory factor analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (1st ed., pp. 99 –136). Washington, DC: American Psychological Association.

Burgess, E.W. & Wallin, P. *Engagement and Marriage*. Lippincott, 1953.

Campbell, J.P., McCloy, R.A., Oppler, S.H. & Sager, C.E. (1993) A theory of performance. In: N. Schmitt & W.C. Borman (Eds.), *Personnel Selection in Organizations* (pp.35-70). San Francisco: Jossey-Bass.

Carroll, J.B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. New York: Cambridge University Press.

Christenson, O.D., Zabriskie, R.B., Eggett D.L., & Freeman, P.A. (2006). Family acculturation, family leisure involvement, and family functioning among Mexican-Americans. *Journal of Leisure Research, 38,* 475-495.

Ciairano, S., Bonino, S., & Miceli, R. (2006). Cognitive flexibility and social competence from childhood to early adolescence. *Cognition, Brain, Behavior, 10,* 343-366.

Costa, P.T., & McCrae, R.R. (1992). *NEO PI-R. Professional manual*. Odessa, FL: Psychological Assessment Resources, Inc.

Dobzhansky, Th., & Montagu, M.F.A. (1947). Natural Selection and the Mental Capacities of Mankind, *Science, 105,* 587-590.

Flemming, E.G. (1933). The pleasing personality of high-school girls as related to other traits and measures. *Journal of Educational Sociology, 6,* 401-409

Fugate, M. & Kinicki, A.J. (2008). A dispositional approach to employability: Development of a measure and test of implications for employee reactions to organizational change. *Journal of Occupational and Organizational Psychology, 81,* 503–527.

Gibbons, C.C. & Porter, J.P. (1939). Some aspects of social adaptability among adolescents. Journal of Applied Psychology, 23, 508-520.

Goldberg, L. R. (1992). The development of markers for the Big-five factor structure. *Journal of Personality and Social Psychology, 59*, 1216-1229.

Goleman, Daniel. 2006. *Social Intelligence: The New Science of Human Relationships*. New York, NY: Bantam Books.

Gorsuch, R.L. (1983). *Factor Analysis*. (2nd ed.). Hillsdale, NJ: Erlbaum.

Hall, D.T. (2002). *Careers in and out of organizations*. Thousand Oaks, CA: Sage.

Hayes, S.C., Luoma, J.B., Bond, F.W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44,* 1-25.

Heppner, P. (1988). *The Problem Solving Inventory (PSI): Manual*. Palo Alto, CA: Consulting Psychologists.

Heppner, P. P. & Baker, C. E. (1997). Applications of the Problem Solving Inventory. *Measurement and Evaluation in Counseling And Development, 29*, 229-441.

Heppner, P. & Peterson, C. (1982). The development and implementation of a personal problem-solving inventory. *Journal of Counseling Psychology, 29,* 66-75.

Herr, E.L. (1993) Contexts and influences on the need for personal flexibility for the 21st Century. *Canadian Journal of Counseling, 27,* 148-164.

Heslin, P.A. (2005). Experience career success. *Organizational Dynamics, 34,* 376-390.

Horn, J.L. & Noll, J. (1997). Human cognitive capabilities: Gf-Gc theory. In: Flanagan, Genshaft, & Harrison (Eds.), *Contemporary Intellectual Assessment* (pp. 53-91). New York: Guilford Press.

Hu, L. & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55.

Hutcheson, Graeme and Nick Sofroniou (1999). *The multivariate social scientist: Introductory statistics using generalized linear models*. Thousand Oaks, CA: Sage Publications.

Judge, T.A., Thoresen, C.J., Pucik, V., & Welbourne, T.M. (1999). Managerial coping with organizational change: A dispositional perspective. *Journal of Applied Psychology, 84,* 107-122.

Keith, T. Z. (2006). Multiple regression and beyond. Boston: Allyn & Bacon.

Laycock, S.R. (1929). *Adaptability to New Situations*. Baltimore: Warwick & York, Inc.

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer.

LePine, J.A., Colquitt, J.A., & Erez, A. (2000). Adaptability to changing task contexts: Effects of general cognitive ability, conscientiousness, and openness to experience. *Personnel Psychology, 53,* 563-593.

Lovett, M.C. & Schunn, C.D. (1999). Task representations, strategy variability, and base-rate neglect. *Journal of Experimental Psychology: General, 128,* 107-130.

MacEachen, E., Polzer, J., & Clarke, J. (2008). "You are free to set your own hours": Governing worker productivity and health through flexibility and resilience. *Social Science and Medicine, 66,* 1019-1033.

Martin, M. M., & Rubin, R. B. (1995). A new measure of cognitive flexibility. *Psychological reports, 76,* 623-626.

Mayer, J.D., Salovey, P., & Caruso, D.R. (2002). *Mayer–Salovey-Caruso Emotional Intelligence Test: Manual*. Toronto, Ontario, Canada: Multi-Health Systems.

McCrae R.R., and Costa P.T., Jr. (1989): Different points of view: Self-reports and ratings in the assessment of personality. In: J.P. Forgas, and M.J. Innes (Eds.): *Recent advances in social psychology: An international perspective*. (pp. 429-439). Amsterdam: Elsevier Science.

McDonnell, T.E. & Beck, M. (1986). Temperament and psycho-social development. *Education, 106,* 413-418.

Nagel, O. (1908) The evolution of the senses. *Psychological Bulletin, 5*(2), 349-350.

O'Connell, D.J., McNeely, E., & Hall, D.T. (2008). Unpacking personal adaptability at work. *Journal of Leadership, Organizational Studies, 14,* 248-259.

Olson, D.H., Russell, C.S., & Sprenkle, D.H. (1983). Circumplex model of marital and family systems: VI. Theoretical update. *Family Process, 22,* 69-83.

Pearlin, L.I., Menaghan, E.G., Lieberman, M.A., & Mullen, J.T. (1981). The stress process. *Journal of Health and Social Behavior, 22,* 337-356.

Pearlin, L.I. & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19,* 2-21.

Pearlman, K. & Barney, M.F. (2000). Selection for a changing workplace. In: J.F. Kehoe (Ed.), *Managing Selection in Changing Organizations*. (pp. 3-72). San Francisco, CA: Jossey-Bass.

Ployhart, R.E. & Bliese, P.D. (2006). Individual adaptability (I-ADAPT) theory: conceptualizing the antecedents, consequences, and measurement of individual differences in adaptability. In: C.S. Burke, L.G. Pierce, & E. Salas (Eds.), *Understanding Adaptability: A Prerequisite for Effective Performance within Complex Environments*. (pp. 3-40). Oxford, UK: Elsevier.

Pulakos, E.D., Arad, S., Donovan, M.A., & Plamondon, K.E. (2000). Adaptability in the workplace: Development of a taxonomy of adaptive performance. *Journal of Applied Psychology, 85,* 612-624.

Pulakos, E.D., Schmitt, N., Dorsey, D.W., Arad, S., Hedge, J.W., & Borman, W.C. (2002). Predicting adaptive performance: Further tests of a model of adaptability. *Human performance, 15,* 299-323.

Reed-Victor, E. & Pelco, L. (2001). Child temperament and personality: Contributions to early school competence and behavior problems. Paper presented at the 10th European Conference on Developmental Psychology, Uppsala, Sweden.

Riggio, R.E. (1989). *Manual for the Social Skills Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Rosca, A. (1936). Adaptabilitate sociala (Social adaptability). *Buletinul Societatea de Psihologie Medicală Sibiu, 2,* 18-21.

Salovey, P. & Mayer, J.D. (1989). Emotional intelligence. *Imagination, Cognition, and Personality, 9,* 185-211.

Spearman, G. (1927). *The Abilities of Man: Their Nature and Measurement*. New York: The Macmillan Co.

Tallman, I. (1961). Adaptability: A problem-solving approach to assessing childrearing practices. *Child Developmment, 32,* 651-668.

Taylor, S.E. & Aspinwall, L.G. (1996) Mediating and moderating processes in psychosocial stress: Appraisal, coping, resistance, and vulnerability. In: H.B.

Kaplan (Ed.) *Psychosocial stress: Perspectives on structure, theory, life-course, and methods*. (pp. 71-110). San Diego, CA: Academic Press.

Thomas, A., Chess, S., Birch, H.G., Hertzig, M.E., & Korn, S. (1963). *Behavioral individuality in early childhood*. Oxford, England: New York U. Press

Thoresen, C.J., Bradley, J.C., Thoresen, J.D., & Bliese, P.D. (2004). The big five personality traits and job performance across time in matentance and transitional job stages. *Journal of Applied Psychology, 89,* 835-853.

Thurstone, L.L. (1935). *The Vectors of the Mind: Multiple-Factor Analysis For The Isolation Of Primary Traits*. Chicago, IL: University of Chicago Press.

Walker, C., Gleaves, A., & Grey, J. (2006) Can students within higher education learn to be resilient and, educationally speaking, does it matter?. *Educational Studies,32*, 251- 264.

Wanberg, C.R. & Banas, J.T. (2000). Predictors and outcomes of openness to changes in a reorganizing workplace. *Journal of Applied Psychology, 2000,* 132-142.

Wells, F.L. (1914) The Systematic Observation of the Personality: In its relation to the hygiene of mind, *Psychological Review, 21,* 295-333.

Wong, S.S. & Ang, R.P. (2007) Emotional competencies and maladjustment in Singaporean adolescents, *Personality and Individual Differences, 43,* 2193-2204.

Zaccaro, S.J., Gilbert, J.A., Thor, K.K. & Mumford, M.D. (1991). Leadership and social intelligence: Linking social perceptiveness and behavioral flexibility to leader effectiveness. *Leadership Quarterly, 2,* 317-342.

Zupancic, M. & Kavcic, T. (2003). Contemporaneous prediction of social behavior in preschool children from a set of personality dimensions. *Studia Psychologica, 45,* 187-201.